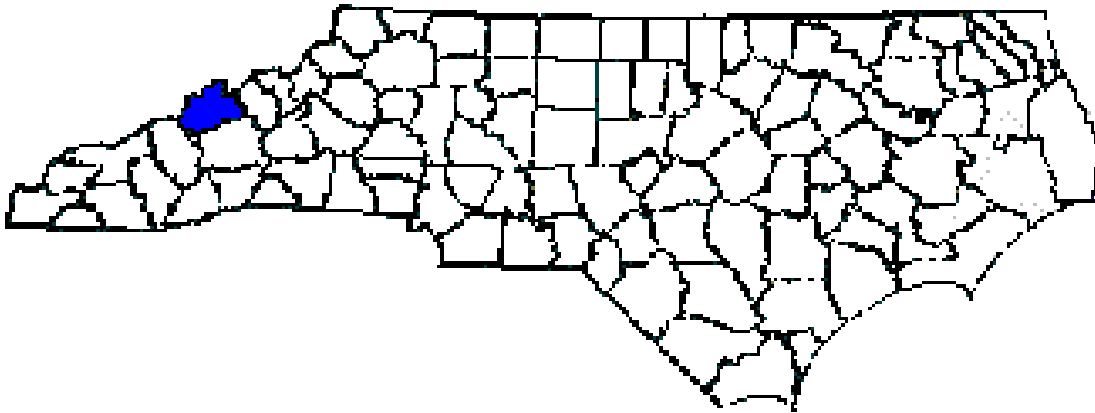


ANNUAL REPORT FOR 2015



Holland Creek Site M Mitigation Site
Madison County
TIP No. R-2518A
COE Action ID: SAW-2007-2197-357/300
DWR #: 20071134



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SUMMARY

The following report summarizes the stream monitoring activities that have occurred during the Year 2015 at the Holland Creek Site M Mitigation Site in Madison County. The North Carolina Department of Transportation (NCDOT) completed this project and water was turned in December 2008. This report provides the monitoring results for the sixth formal year of monitoring (Year 2015). The Year 2015 monitoring period was the sixth of five scheduled years of monitoring on the Holland Creek Site M Mitigation Site (See Success Criteria Section 2.1).

Based on the overall conclusions of monitoring at the Holland Creek Site M, it has met the required monitoring protocols for the sixth formal year of monitoring on the stream and the fourth formal year of monitoring on the planted vegetation. A supplemental planting of the northeast side of the buffer took place in March 2015.

It was agreed by the Regulatory Agencies and NCDOT during the March 25, 2014 Annual Monitoring Meeting that the longitudinal profile could be discontinued for the remainder of the five year monitoring period due to heavy vegetation within the channel. Also, it was agreed by the Regulatory Agencies and NCDOT during the March 18, 2015 Annual Monitoring Meeting that all surveying could be discontinued. In lieu of doing the stream survey, visual inspection of the channel stability throughout the reach and photo documentation at the permanent photo point locations would be completed. All other monitoring activities will continue to be completed throughout the monitoring period. The channel throughout the stream restoration site is stable at this time. NCDOT proposes to continue visual stream and vegetation monitoring in 2016.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the stream monitoring activities that have occurred during the Year 2015 at the Holland Creek Site M Mitigation Site. Site M is located on US 19 in Madison County at Sta. 81+80 to 82+20 Lt. and Sta. 81+30 Rt. -L- (Figure 1). The Holland Creek Site M was constructed to provide mitigation for stream impacts associated with Transportation Improvement Program (TIP) number R-2518A in Madison County.

The mitigation site provided approximately 276 linear feet of stream restoration. Construction was completed and water was turned in December 2008 by the NCDOT. Stream restoration involved installing several in-stream cross vane structures and planting the riparian buffer zone.

1.2 Purpose

In order for a mitigation site to be considered successful, the site must meet the success criteria. This report details the monitoring in 2015 at the Holland Creek Site M Mitigation Site. Hydrologic monitoring was not required for this site.

1.3 Project History

December 2008	Construction Completed
December 2008	Water Turned Into Stream
March 2009	Site Planted (Type I only)
October 2009	As-Built Survey Completed
November 2010	Stream Channel Monitoring (Year 1)
November 2011	Stream Channel Monitoring (Year 2)
March 2012	Site Planted (Type I and II)
September 2012	Vegetation Monitoring (Year 1)
November 2012	Stream Channel Monitoring (Year 3)
February 2013	Supplemental Buffer Planting
March 2013	Bankfull Monitoring Gauge Installed
August 2013	Vegetation Monitoring (Year 2)
November 2013	Stream Channel Monitoring (Year 4)
May 2014	Herbicide Application
June 2014	Herbicide Application
July 2014	Vegetation Monitoring (Year 3)
November 2014	Stream Channel Monitoring (Year 5)
March 2015	Supplemental Planting Of Northeast Buffer
July 2015	Vegetation Monitoring (Year 4)
November 2015	Visual Stream Channel Monitoring (Year 6)

1.4 Debit Ledger

The entire Holland Creek Site M stream mitigation site was used for the R-2518A project to compensate for unavoidable stream impacts.

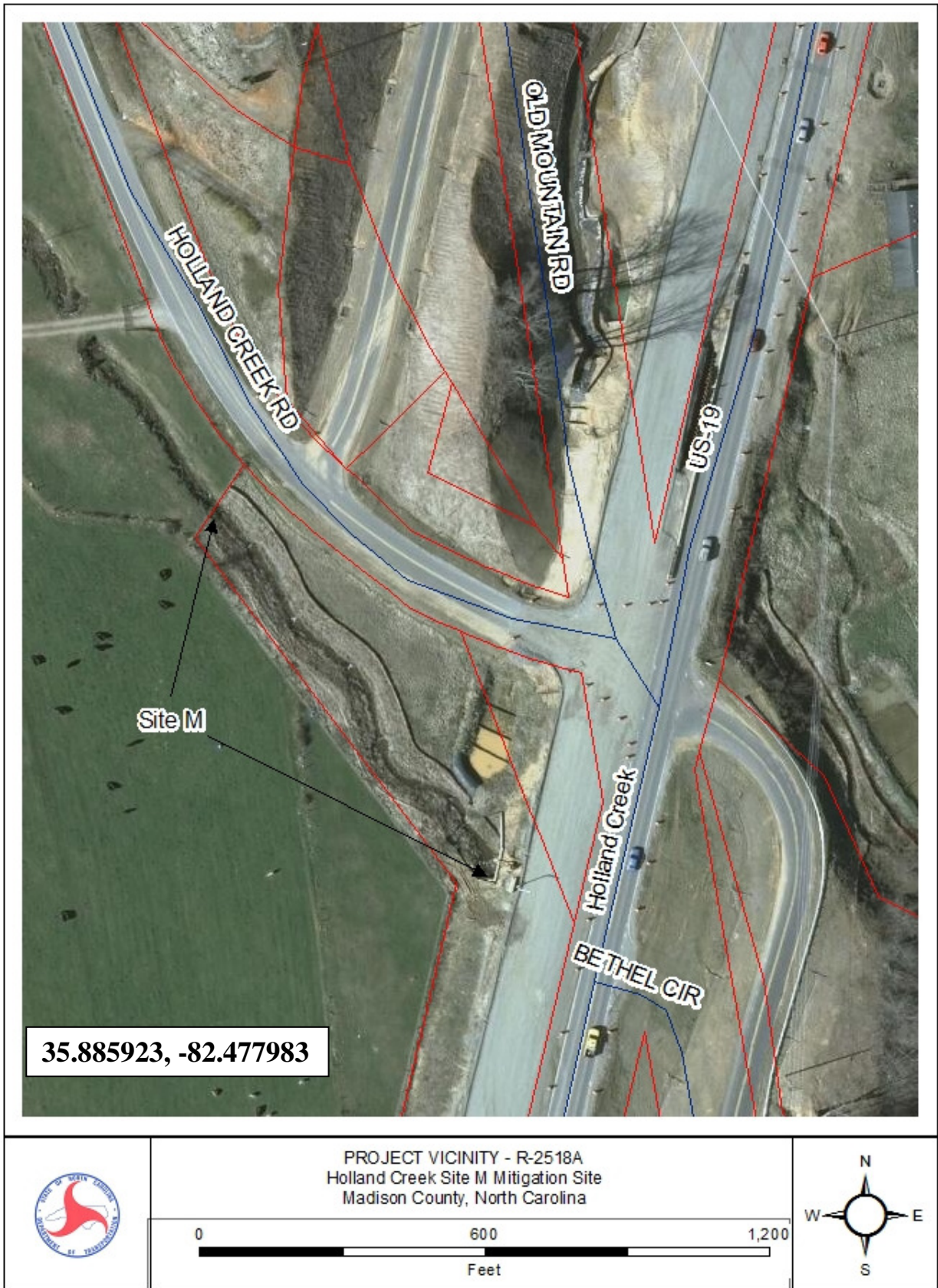


Figure 1. Vicinity Map

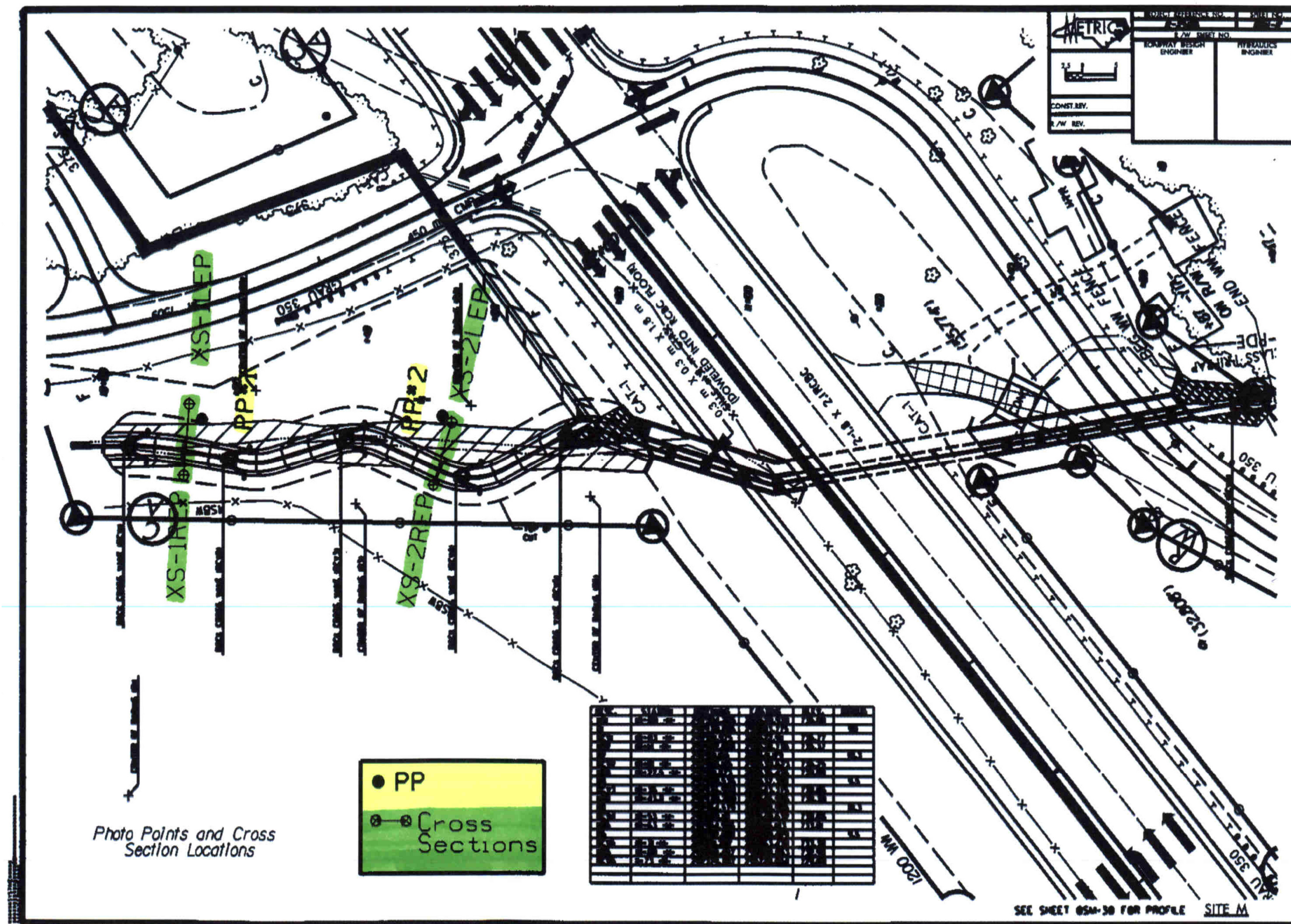


Figure 2. Site M Map

STREAMBANK REFORESTATION FOR SITE M & N



PROJECT REFERENCE NO.	SHEET NO.
R-2518A	RF-12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

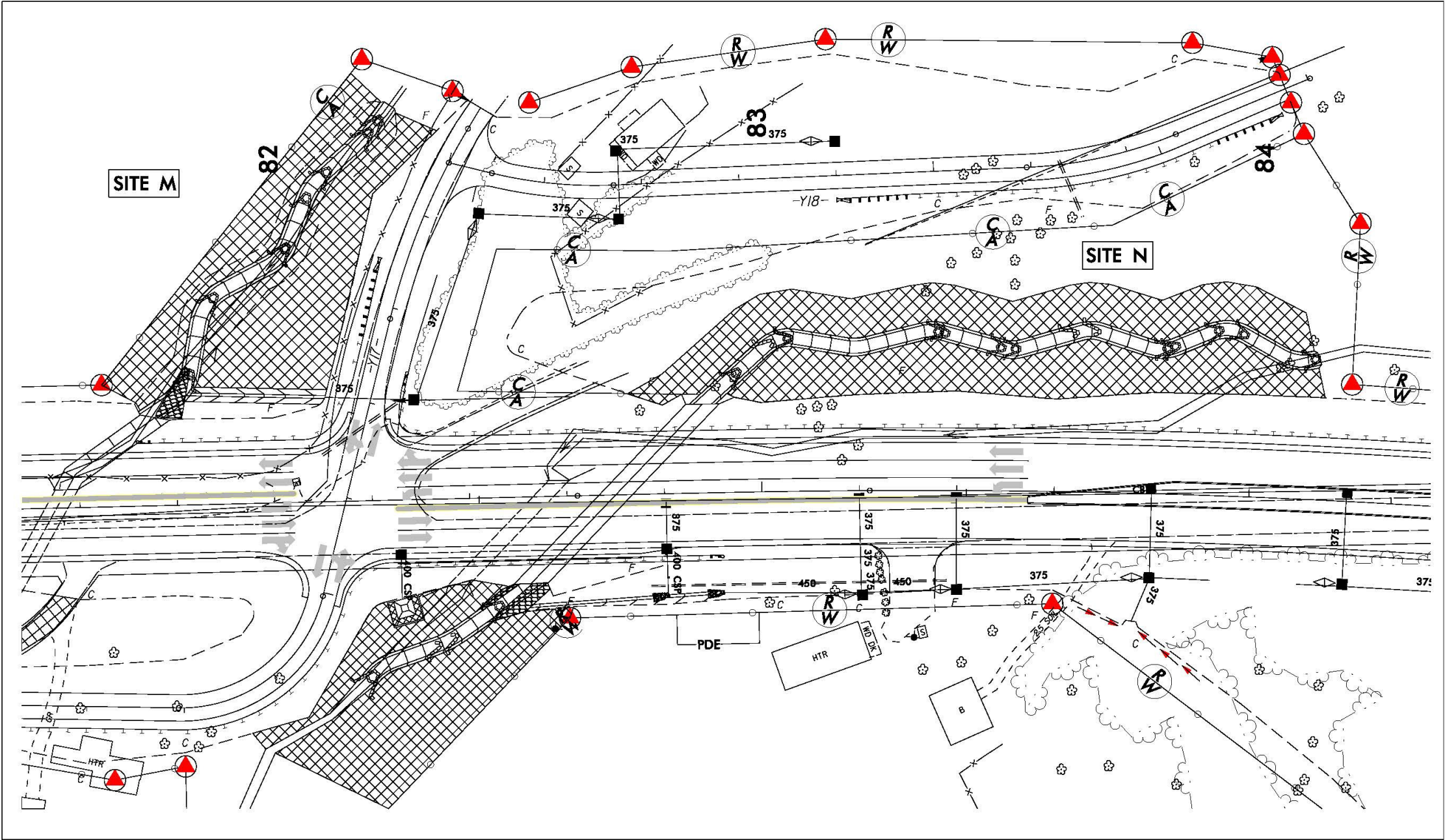


Figure 3. Site M Reforestation Map

2.0 STREAM ASSESSMENT

2.1 Success Criteria

The permittee shall monitor the restoration and enhancement mitigation sites following the Level 1 protocols outlined in the "Stream Mitigation Guidelines," dated April 2003 with the following exceptions:

1. Pebble counts shall not be conducted.
2. Two cross sections shall be conducted for streams less than 500 linear feet and five (5) cross sections shall be conducted for streams greater than 500 linear feet.
3. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

The permittee shall monitor the preservation sites by visual inspection. Photos will be taken and comments noted on plant survival. The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWQ in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWQ to schedule a site visit to "close out" the mitigation site.

2.2 Stream Description

2.2.1 Post-Construction Conditions

The restoration/relocation of the Holland Creek Site M Mitigation Site involved installing several in-stream cross vane structures and planting the riparian buffer zone.

2.2.2 Monitoring Conditions

The objective of the Holland Creek Site M stream restoration was to restore a B4c stream as identified in Rosgen's Applied River Morphology. A total of two cross sections (one in a riffle and one in a pool) were surveyed. For this report, only cross sections containing riffles were used in the comparison of channel morphology. Morphology table comparison can be found in the 2010 to 2014 monitoring reports.

2.3 Results of the Stream Assessment

2.3.1 Site Data

The assessment included the survey of two cross sections and the longitudinal profile of the Holland Creek Site M established by NCDOT after construction. The length of the profile along the Holland Creek Site M was approximately 300 linear feet. Two cross sections were established during the as-built monitoring year. Cross section locations were subsequently based on the stationing of the longitudinal profile and are presented below. The location of the cross sections and longitudinal profile are shown in the 2010 to 2014 monitoring reports Appendix A.

Holland Creek Site M Cross-Sections:

- ◆ Cross-Section #1: Holland Creek Site M, Station 62+00, midpoint of riffle
- ◆ Cross-Section #2: Holland Creek Site M, Station 198+50, midpoint of pool

Based on comparisons of the As-Built to the monitoring data, all of the cross sections appear stable with little or no active bank erosion. Graphs of the cross sections are presented in the 2010 to 2014 monitoring reports Appendix A.

It was agreed by the Regulatory Agencies and NCDOT during the March 25, 2014 Annual Monitoring Meeting that the longitudinal profile could be discontinued for the remainder of the five year monitoring period due to heavy vegetation within the channel. Also, it was agreed by the Regulatory Agencies and NCDOT during the March 18, 2015 Annual Monitoring Meeting that all stream surveying could be discontinued. In lieu of doing the stream survey, visual inspection of the channel stability throughout the reach and photo documentation at the permanent photo point locations would be completed. All other monitoring activities will continue to be completed throughout the monitoring period. Pebble counts were not required per the permit conditions and therefore were not completed. Five bankfull events were documented by surface water gauge at Site M during the 2013 and 2014 monitoring years.

3.0 VEGETATION: HOLLAND CREEK SITE M

3.1 Description of Species

The following tree species were planted on the streambank:

Salix nigra, Black Willow

Cornus amomum, Silky Dogwood

The following tree species were planted in the buffer area:

Liriodendron tulipifera, Yellow Poplar

Platanus occidentalis, Sycamore

Fraxinus pennsylvanica, Green Ash

Quercus alba, White Oak

3.2 Results of Vegetation Monitoring

Streambank & Buffer Vegetation: The streambank reforestation was completed in March 2012. NCDOT completed a supplemental planting of the northeast buffer in March 2015 to increase plant survival in this area. The Year 4 vegetation monitoring evaluation noted: Type I: Black Willow, Silky Dogwood and Type II: Sycamore, Green Ash, White Oak and Tulip Poplar were surviving throughout the site.

3.3 Conclusions

NCDOT will continue to monitor the planted vegetation in 2016.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The Holland Creek Site M Mitigation Site has met the required monitoring protocols for the sixth formal year of monitoring on the stream and the fourth formal year of monitoring on the planted vegetation. The channel throughout the stream restoration site is stable and the planted vegetation is surviving.

NCDOT proposes to continue visual stream and vegetation monitoring in 2016.

5.0 REFERENCES

Stream Mitigation Plan, US Highway 19, R-2518A On-Site Mitigation
Madison County, North Carolina, August 2006.

Design Plans for R-2518A, US 19 from I-26 to 0.8 KM east of the Yancey Co.
Line, Stream Mitigation (Preservation, Enhancement, and Restoration),
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North Carolina Department of Transportation (NCDOT), April 29, 2008. 404 and
401 Individual Permits for R-2518A and R-2518B (ACOE Permit No. 2007-
2197-357/300 and DWQ Project No. 20071134, Individual Certification No.
3706).

Rosgen, D.L, 1996. Applied River Morphology. Wildland Hydrology, Pagosa
Springs, Colorado.

US Army Corps of Engineers (USACE), 2003. Stream Mitigation Guidelines.
Prepared with cooperation from the US Environmental Protection Agency,
NC Wildlife Resources Commission, and the NC Division of Water Quality.

APPENDIX A
SITE PHOTOGRAPHS

Holland Creek Site M



Photo Point #1 (Upstream)



Photo Point #1 (Downstream)



Photo Point #2 (Upstream)



Photo Point #2 (Downstream)

November 2015

Holland Creek Site M



Vegetation Overview Photo

July 2015